Amendments to the Claims:

This listing of claims will replace the claims in the application.

Listing of Claims:

Claims 1 - 12 (withdrawn)

Claim 13 (original) A tool for steering a downhole drilling apparatus with respect to a geological bed boundary in an earth formation, said tool having a tool axis and comprising:

a first transmitter antenna disposed within a plane oriented at a first angle with respect to the tool axis for transmitting a first transmitted electromagnetic wave into said formation, wherein said first transmitted electromagnetic wave induces a first electric current in said formation, and wherein said first electric current generates a first induced electromagnetic wave in said formation;

a second transmitter antenna spaced apart from said first transmitter antenna along the tool axis and disposed within a plane oriented at a second angle with respect to the tool axis for transmitting a second transmitted electromagnetic wave into said formation, wherein said second transmitted electromagnetic wave induces a second electric current in said formation, and wherein said second electric current generates a second induced electromagnetic wave in said formation;

a first receiver antenna located at a first receiver location along said tool axis between said first and second transmitter antennas for receiving said first and second induced electromagnetic waves, said first receiver antenna being oriented at a third angle with respect to said tool axis, and said third angle being different from said first and second angles;

a second receiver antenna located at a second receiver location along said tool axis between said first and second transmitter antennas for receiving said first and second induced electromagnetic waves, said second receiver location being different from said first receiver

location, said second receiver antenna being oriented at a fourth angle with respect to said tool axis, and said fourth angle being different from said first and second angles; and

a processor in communication with said first and second receiver antennas;

wherein said first receiver antenna generates a first response signal based on said first induced electromagnetic wave, and said second receiver antenna generates a second response signal based on said first induced electromagnetic wave, said first and second response signals being proportional to the electrical resistivity of a portion of said formation;

wherein said first receiver antenna generates a third response signal based on said second induced electromagnetic wave, and said second receiver antenna generates a fourth response signal based on said second induced electromagnetic wave, said third and fourth response signals being proportional to the electrical resistivity of a portion of said formation; and

wherein said processor receives said first, second, third, and fourth response signals and generates an output signal as a function of borehole depth based on said first, second, third, and fourth response signals, wherein said output signal is indicative of the relative position of said tool with respect to said geological bed boundary as said tool approaches said geological bed boundary.

Claim 14 (original) The tool of claim 13 wherein said first and second angles are substantially the same.

Claim 15 (original) The tool of claim 13 wherein said first and second angles are substantially right angles.

Claim 16 (original) The tool of claim 13 wherein said third and fourth angles are substantially the same.

Claims 17 - 41 (withdrawn)

Claim 42 (original) A method for steering a downhole drilling apparatus with respect to a geological bed boundary in an earth formation, said drilling apparatus including an electromagnetic propagation logging tool having a tool axis; a first transmitter antenna disposed within a plane oriented at a first angle with respect to the tool axis; a second transmitter antenna spaced apart from said first transmitter antenna along the tool axis and disposed within a plane oriented at a second angle with respect to the tool axis; a first receiver antenna located at a first receiver location along said tool axis between said first and second transmitter antennas, said first receiver antenna being oriented at a third angle with respect to said tool axis, said third angle being different from said first and second angles; a second receiver antenna located at a second receiver location along said tool axis between said first and second transmitter antennas, said second receiver location being different from said first receiver location, said second receiver antenna being oriented at a fourth angle with respect to said tool axis, said fourth angle being different from said first and second angles; and a processor in communication with said first and second transmitter antennas and said first and second receiver antennas; said method comprising the steps of:

(a) transmitting a first transmitted electromagnetic wave into said formation using said first transmitter antenna, wherein said first transmitted electromagnetic wave induces a first electric current in said formation, and wherein said first electric current generates a first induced electromagnetic wave in said formation;

(b) transmitting a second transmitted electromagnetic wave into said formation using said second transmitter antenna, wherein said second transmitted electromagnetic wave induces a second electric current in said formation, and wherein said second electric current generates a second induced electromagnetic wave in said formation;

(c) receiving said first induced electromagnetic wave with said first receiver antenna thereby generating a first response signal based upon said first induced electromagnetic wave, said first response signal being proportional to the electrical resistivity of a portion of said formation;

(d) receiving said first induced electromagnetic wave with said second receiver antenna thereby generating a second response signal based upon said first induced electromagnetic wave, said second response signal being proportional to the electrical resistivity of a portion of said formation;

(e) receiving said second induced electromagnetic wave with said first receiver antenna thereby generating a third response signal based upon said second induced electromagnetic wave, said third response signal being proportional to the electrical resistivity of a portion of said formation;

(f) receiving said second induced electromagnetic wave with said second receiver antenna thereby generating a fourth response signal based upon said second induced electromagnetic wave, said fourth response signal being proportional to the electrical resistivity of a portion of said formation;

(g) sending said first, second, third, and fourth response signals to said processor;

(h) operating said processor to generate a first differential signal based on said first and second response signals;

(i) operating said processor to generate a second differential signal based on said third and fourth response signals;

(j) operating said processor to generate an output signal as a function of borehole depth based on said first and second differential signals, wherein said output signal is indicative of the

relative position of said tool with respect to said geological bed boundary as said tool approaches said geological bed boundary; and

(k) controlling the drilling direction of said drilling apparatus in response to said output signal.

Claim 43 (original) The method of claim 42 wherein:

said first differential signal comprises the phase difference between said first and second response signals; and

said second differential signal comprises the phase difference between said third and fourth response signals

Claim 44 (original) The method of claim 42 wherein:

said first differential signal comprises the amplitude ratio of said first and second response signals; and

said second differential signal comprises the amplitude ratio of said third and fourth response signals.

Claim 45 (original) The method of claim 42 wherein:

said first differential signal comprises a phase shift resistivity value based on the phase difference between said first and second response signals; and

said second differential signal comprises a phase shift resistivity value based on the phase difference between said third and fourth response signals.

Claim 46 (original) The method of claim 42 wherein:

said first differential signal comprises an amplitude attenuation resistivity value based on the amplitude ratio of said first and second response signals; and

said second differential signal comprises an amplitude attenuation resistivity value based on the amplitude ratio of said third and fourth response signals.

Claim 47 (original) The method of claim 42 wherein said output signal comprises the difference of said first and second differential signals.

Claim 48 (original) The method of claim 42 wherein said output signal comprises the ratio of said first and second differential signals.

Claims 49 - 62 (withdrawn)